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10/750,549	12/31/2003	Sumeet Sandhu	42P17433	5586

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EXAMINER	
PHU, PHUONG M	
ART UNIT	**PAPER NUMBER**
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,549	SANDHU, SUMEET	
	Examiner	Art Unit	
	Phuong Phu	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-27* is/are rejected.

7)☒ Claim(s) *8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/01/04,12/09/05,08/18/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following reasons:

-On page 1, line 5, information for "60/TBD" and "TBD" is required.

-It is unclear what the "Rayleigh fading channel taps" are, (see page 9, line 23), and how they are generated and used in the "diversity agent 212" and what the purpose of the use of the "Rayleigh fading channel taps".

-It is unclear how "MtxN/L" blocks are formed, (see page 14, line 3), if MtxN is not a multiple of L".

-It is unclear whether "the length of the channel impulse in time (L)", (see page, line), is the same as the "Rayleigh fading channel taps (L)", (see page 16, line 7).

Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claims 5, 7 and 13 are objected to because of the following informalities:

-Claim 5 recites the limitation "delay spread spread L". It is unclear whether the limitation refers to "the Rayleigh fading channel taps (L)", previously recited in claim 3.

-Claim 7 recites the limitation "frequency blocks (L)". It is unclear whether the limitation refers to "the Rayleigh fading channel taps (L)", previously recited in claim 3.

-Claim 13 recites the limitation "one or more of converting dispersed content from *a time domain to a frequency domain*". It appears that the limitation should be -- one or more of converting dispersed content from *a frequency domain to a time domain* --.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-7, 9-13, 15-17 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Wallace et al (6,473,467).

-Regarding claim 1, Wallace et al discloses a method (see figures 3 and 4A) comprising:

procedure (334) (see figure 3) of receiving content from a host device (comprising CHANNEL DATA PROC (332)) for transmission via two or more tones in a multicarrier (OFDM) communication channel from two or more antenna(e) (116A, 116B,...,116T) (see col. 9, lines 29-48, col. 19, line 58 to col. 20, line 32, col. 21, line 15 to col. 22, line 38); and

procedure (comprising (400, 410) (see figure 4A) and (114A,..,114T) (see figure 3)) of distributing elements of the received content across one or more of the antenna(s) and tone(s) to introduce full-order transmit diversity (see col. 19, line 58 to col. 20, line 58, col. 21, line 15 to col. 22, line 38).

-Regarding claim 2, Wallace et al discloses that the received content is a stream of quadrature amplitude modulation (QAM) symbols, e.g. "64-QAM" symbols, received from the host device (CHANNEL DATA PROCESOR) (see figure 5A, col. 23, lines 8-52).

-Regarding claim 3, Wallace et al discloses that the element of distribution comprises: cyclically disperses elements of the received content across Mt transmit antennas "transmit antennas" , and a number (N), N="L", of multicarrier tones "sub-channels" for each of a plurality

of elements of a eigenvector matrix "E", (see col. 6, lines 39-67, col. 13, line 22 to col. 14, line 9), (the plurality of elements of the eigenvector matrix considered here equivalent with the limitation "plurality of Rayleigh fading channel taps (L)".

-Regarding claim 4, Wallace et al discloses that the cyclical dispersion of the elements of the received content provides full-order transmit diversity according to Mt*Mr*L, where Mr is the number of receive antennas (see col. 13, line 29 to col. 14, line 9).

-Regarding claim 5, Wallace et al discloses that the cyclic dispersion is a function of delay spread (see col. 25, line 45 to col. 26, line 27).

-Regarding claim 6, Wallace et al discloses that the cyclic dispersion of the elements is adaptively determined based, at least in part, on an observation of multipath conditions of the channel (see col. 25, line 45 to col. 26, line 27).

-Regarding claim 7, Wallace et al discloses that the cyclic dispersion is increased as a larger number of frequency blocks "sub-channels" where there is a high delay spread (see col. 25, line 45 to col. 26, line 27).

-Regarding claim 9, Wallace et al discloses that a tone delay from antenna to antenna can be great than one (1) (see (Tx3) and (TX1) of figure 1C, col. 15, lines 3-26).

-Regarding claim 10, Wallace et al discloses that the tone delay from antenna to antenna can be adaptively determined based, at least in part, on the spatial correlation, wherein the more correlated the fading on different antennas, the greater the tone delay from antenna to antenna (see figure 1C, col. 15, lines 3-36).

-Regarding claim 11, Wallace et al discloses that received content are complex symbols that are linear or nonlinear combinations of input QAM symbols (see figure 5A, col. 23, lines 8-52).

-Regarding claim 12, Wallace et al discloses procedure (114A, 114B,.., 114T) (see figure 3) of performing additional channel processing prior to transmission of the full-order transmit diversity channel to a remote device.

-Regarding claim 13, Wallace et al discloses that additional channel processing comprising procedure (320A,..., 320T) of converting dispersed content from a frequency domain domain to a time domain, procedure (322A,...,322T) of introducing a cyclical prefix into the signal stream, and procedure (324A,...,324T) of performing front-end radio frequency (RF) processing prior to transmission via one or more of the transmit antenna(s) Mt (see figure 3).

-Regarding claim 15, as similarly applied to claims 1-7, 9-13 set forth above and herein incorporated, Wallace et al discloses an apparatus (see figures 3 and 4A, col. 19, line 58 to col. 20, line 58, col. 21, line 15 to col. 22, line 38) comprising:

a diversity agent (comprising (334) (see figure 3) and/or (400, 410) (see figure 4A)), to receive content from a host device (comprising CHANNEL DATA PROC (332) (see figure 3)) and distribute elements of the received content across one or more of a plurality of transmit antenna(s) (116A, 116B,...,116T) (see figure 3) and tone(s) "sub-channels" of a multicarrier (OFDM) communication channel to generate a transmit signal exhibiting full-order transmit diversity; and

a transmitter, (comprising(114A,..,114T) (see figure 3), responsive to the diversity agent, to transmit the generated transmit signal.

-Claim 16 is rejected with similar reasons set forth for claim 3.

-Regarding claim 17, Wallace et al discloses that the transmitter comprising: an inverse discrete Fourier transform (IDFT) element (320A,...,320T), coupled to the diversity agent, to receive the transmit signal and convert it from a frequency domain to a time domain; and a radio frequency (RF) processing element (324A,...,324T), coupled with the IDFT element, to transmit the generated transmit signal via a select one or more of a plurality Mt of transmit antennas (116A,..,116T) (see figure 3).

-Regarding claim 21, Wallace et al discloses that the apparatus is a transceiver (see col. 4, lines 18-27, col. 19, lines 22-23).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 14, 18-20 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al.

-Regarding claim 14, Wallace et al does not discloses a storage medium comprising content which, when executed by an accessing device, causes the device to implement the method, as claimed.

However, Wallace et al teaches that the method can be implemented with a programmable processor operated to execute instruction codes for carrying out the method (see col. 28, line 66 to col. 29, line 4).

Using a computer memory, in associated with a programmable processor, to store and retrieve instruction codes for the processor to execute instruction codes for carrying out an electrical method is well-known in the art, and the examiner takes Official Notice.

Since Wallace et al does not teach in detail how the programmable processor receives the instruction codes for the execution, it would have been obvious for one skilled in the art to implement Wallace et al with a computer memory for storing and retrieving the instruction codes to the processor so that the execution would be carried out as expected. With such the implementation in Wallace et al, the computer memory comprising the instruction codes considered equivalent with the limitation "a storage medium comprising content" and the programmable processor" equivalent with the limitation "accessing device".

-Regarding claim 18, Wallace et al does not teach a memory to store content, at least a subset of which is executable content to implement a diversity agent; and control logic, coupled to the memory and the transmitter, to access and execute at least a subset of the content stored in the memory to implement the diversity agent, as claimed.

However, Wallace et al teach that the diversity agent can be implemented as a programmable processor coupled to the transmitter, the processor executing instruction codes to carry out the functions of the diversity agent (see col. 28, line 58 to col. 29, line 4).

Using a computer memory, in associated with a programmable processor, to store and retrieve instruction codes for the processor to execute instruction codes for carrying out an electrical method is well-known in the art, and the examiner takes Official Notice.

Since Wallace et al does not teach in detail how the programmable processor receives the instruction codes for the execution, it would have been obvious for one skilled in the art to

implement Wallace et al with a computer memory for storing and retrieving the instruction codes to the processor so that the execution would be carried out as expected. With such the implementation in Wallace et al, the computer memory comprising the instruction codes considered equivalent with the limitation "a memory to store content, at least a subset of which is executable content to implement a diversity agent" and the programmable processor" equivalent with the limitation "control logic".

-Regarding claim 19, as applied to claim 18, Wallace et al teaches that the diversity agent, as a control logic, is a baseband processor operating prior to RF processes (see col. 3, lines 55-67).

-Regarding claim 20, as applied to claim 18, Wallace et al teaches that the diversity agent, as a control logic, is a processor, (considered here equivalent with the limitation "application processor").

-Regarding claim 22, Wallace et al does not teach a storage medium comprising content which, when executed, causes an accessing machine to implement the diversity agent.

However, Wallace et al teach that the diversity agent can be implemented as a programmable processor coupled to the transmitter, the processor executing instruction codes to carry out the functions of the diversity agent (see col. 28, line 58 to col. 29, line 4).

Using a computer memory, in associated with a programmable processor, to store and retrieve instruction codes for the processor to execute instruction codes for carrying out an electrical method is well-known in the art, and the examiner takes Official Notice.

Since Wallace et al does not teach in detail how the programmable processor receives the instruction codes for the execution, it would have been obvious for one skilled in the art to

implement Wallace et al with a computer memory for storing and retrieving the instruction codes to the processor so that the execution would be carried out as expected. With such the implementation in Wallace et al, the computer memory comprising the instruction codes considered equivalent with the limitation "storage medium comprising content" and the programmable processor" equivalent with the limitation "an accessing machine".

-Regarding claim 23, as similarly applied to claims 1-7, 9-13, 15-17 and 21 set forth above and herein incorporated, Wallace et al discloses a system (see figures 3 and 4A) comprising:

two or more antennas (116A,...,116T) (see figure 3); and

a diversity agent (comprising (334) (see figure 3) and/or (400, 410) (see figure 4A)), to receive content from a host device (comprising CHANNEL DATA PROC (332) (see figure 3)) and distribute elements of the received content across one or more of the two or more dipole antennas and tone(s) "sub-channels" of a multicarrier (OFDM) communication channel to generate a transmit signal exhibiting full-order transmit diversity diversity (see col. 19, line 58 to col. 20, line 58, col. 21, line 15 to col. 22, line 38).

Wallace et al does not teach that the two or more antennas are dipole antennas.

However, implementing antennas as dipole antennas is well-known in the art, and the examiner takes Official Notice.

Since Wallace et al does not teach in detail how the two or more antennas are implemented, it would have been obvious for one skilled in the art to implement Wallace et al two or more antennas as dipole antennas so that the two or more antennas would be obtained as expected.

-Regarding claim 24, as applied to claim 23, Wallace et al discloses a transmitter (comprising (114A,...,114T)), coupled between the diversity agent and the dipole antennas, to receive one or more substreams of cyclically distributed content from the diversity agent and complete channel processing prior to transmission of the transmit signal from the dipole antennas (see figure 3).

-Regarding claim 25, Wallace et al discloses that the transmitter comprising: an inverse discrete Fourier transform (IDFT) element (320A,...,320T), coupled to the diversity agent, to receive the one or more substreams of cyclically distributed content in a frequency domain and convert it to a time domain representation thereof; and a radio frequency (RF) processing element (324A,...,324T), coupled to the IDFT element, to receive the time domain representation of the cyclically distributed content and amplify it for transmission from the dipole antenna (see figure 3, col. 21, lines 8-14).

-Regarding claim 26, Wallace et al discloses that the transmitter further comprising: a cylical prefix insertion element (322A,...,322T), coupled between the IDFT element and the RF processing element, to introduce cyclical prefix into the time domain representation of the generated transmit signal (see figure 3).

-Claim 27 is rejected with similar reasons set forth for claim 21.

Allowable Subject Matter

7. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (8:00 AM - 4:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Phuong Phu
Primary Examiner
Art Unit 2611

Phuong Phu
11/18/07

PHUONG PHU
PRIMARY EXAMINER